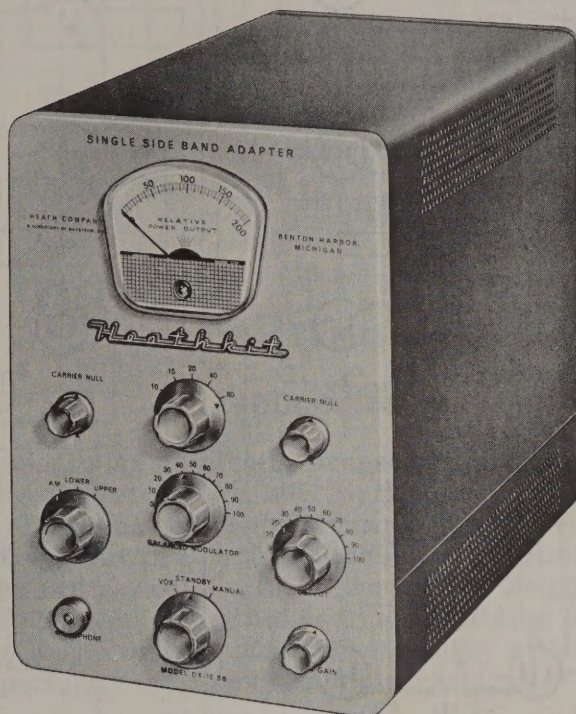


HEATHKIT SINGLE SIDEBAND ADAPTER MODEL SB-10



SPECIFICATIONS

Power Output:.....	10 watts, P. E. P. (peak envelope power)
Excitation Requirements:.....	Less than 3 watts of RF at the fundamental operating frequency required.
Output:.....	Pi network coupling to low impedance coaxial line.
Input:.....	Low impedance for coaxial line feed.
Band Coverage:.....	80, 40, 20, 15, 10 meters.
Circuitry:.....	Phasing method of SSB signal generation is employed with voice control and anti-trip action built into the audio circuit.
Tube Complement:.....	1 - EL84/6BQ5 RF output 1 - 6CL6 RF driver 2 - 12AT7 balanced modulators 1 - 12AX7 speech amplifier 1 - 12AT7 modulator 1 - 12AT7 voice control and anti-trip amplifier 1 - 12AT7 audio driver and relay control 1 - 6AL5 voice control and anti-trip bias rectifier



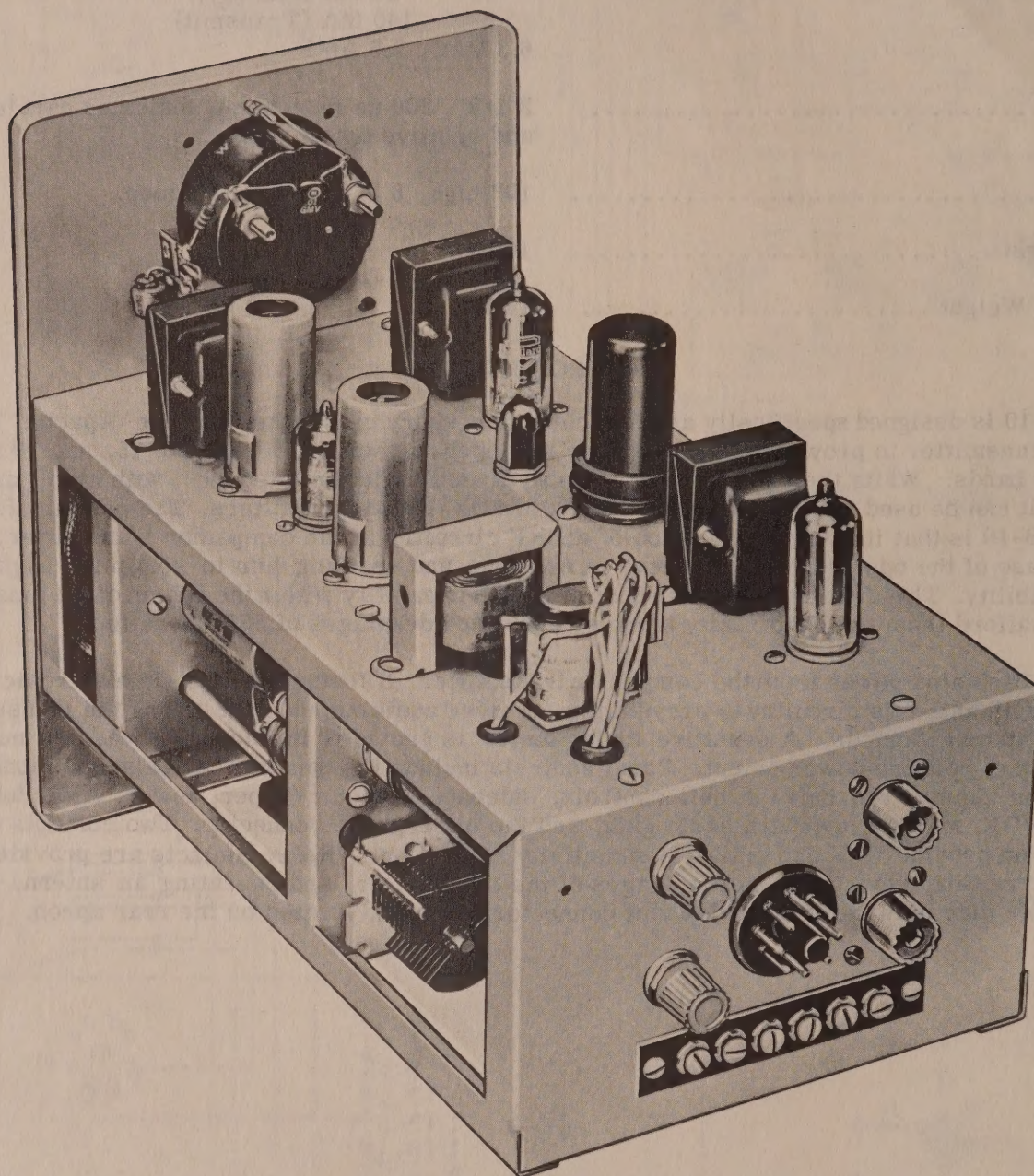
**SCHEMATIC
HEATHKIT SINGLE SIDEBAND ADAPTER
MODEL SB-10**

Unwanted Sideband Suppression:.....	In excess of 30 db.
Carrier Suppression:.....	In excess of 40 db.
Power Requirements:.....	350 VDC, 85 MA (Average) 30 MA (Standby) 140 MA (Transmit) 6.3 VAC, 3.5 AMP
Meter:.....	2 1/2", 200 ua movement, indicates carrier null and relative power output.
Cabinet:.....	10" high, 6 3/4" wide, 13" deep.
Net Weight:.....	10 lbs.
Shipping Weight:.....	14 lbs.

INTRODUCTION

The SB-10 is designed specifically as a matching accessory unit to the Heathkit "Apache" Model TX-1 Transmitter to provide a capability for SSB operation on the 80, 40, 20, 15, and 10 meter amateur bands. While the SB-10 can be plugged directly into the "Apache", with slight modifications it can be used with the Heathkit DX-100 and DX-100B transmitters. The primary feature of the SB-10 is that it allows utilization of all RF circuitry in the companion transmitter, thus making use of the operator's investment in AM gear and enabling him to retain his high level AM capability. This feature brings the cost of an SSB capability within the budget of all amateurs and will afford them the opportunity to experience the advantages of SSB operation.

The SB-10 obtains power from the companion transmitter. It features a built-in electronic voice control with anti-trip circuitry to prevent the receiver audio output from keying the transmitter during listening periods. A sensitive tuning meter is provided for accurate carrier null and indication of relative power output. Panel controls include the bandswitch, balanced modulator and output tuning, two carrier null controls, sideband selector (upper, lower, AM), function switch (VOX, standby, manual), audio gain, and the microphone connector. Two controls on the rear apron provide VOX and anti-trip sensitivity adjustment. Relay contacts are provided for receiver muting, keying the exciter stages of the transmitter, and operating an antenna relay. The power plug plus the input and output connectors are also located on the rear apron.



SB-10/DX-40

The SB-10 may be used in conjunction with the DX-40 with satisfactory results by a few minor circuit alterations to the transmitter and the addition of an outboard power supply to the side-band adapter. This power supply must also furnish fixed bias voltage for the DX-40.

Full power output should be available on all bands except 10 meters, where the power output will be somewhat reduced.

Stability is good on all bands.

All parts are standard and may be obtained at your local radio jobber or repair shop. The Heath Company does not supply the power supply or components necessary for alteration of the DX-40 in kit form, nor can we furnish the parts.

We suggest the microphone connector should be removed from the rear of the DX-40 chassis and relocated between the key jack and operational switch.

The two coax receptacles necessary should be installed at the rear of the DX-40 chassis, one in the hole left by the removal of the microphone connector and the other installed between the two coax receptacles now located on the rear of the chassis.

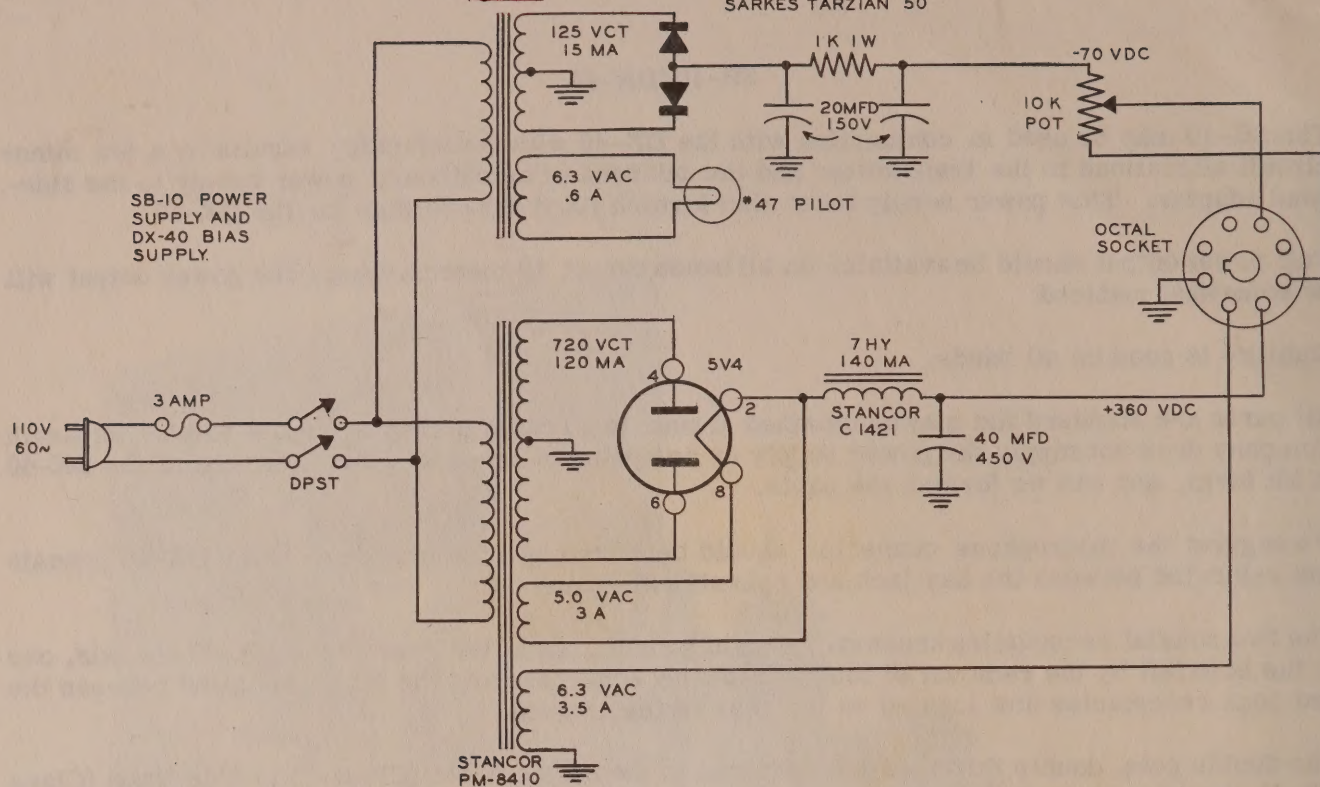
The double pole, double throw switch required to switch from AM (Class C) to Side Band (Class AB-1) should be installed on the front of the transmitter between the band switch and the pilot light. The installation of parts as suggested will leave the front panel with a balanced look.

The two OB-2 tubes may be mounted either on the side of the shield bracket located on the underside of the chassis or on a sub-assembly chassis that may be attached to the side of the shield bracket. The tubes will be in a horizontal position and facing the left side of the chassis when viewed from the rear of the transmitter.

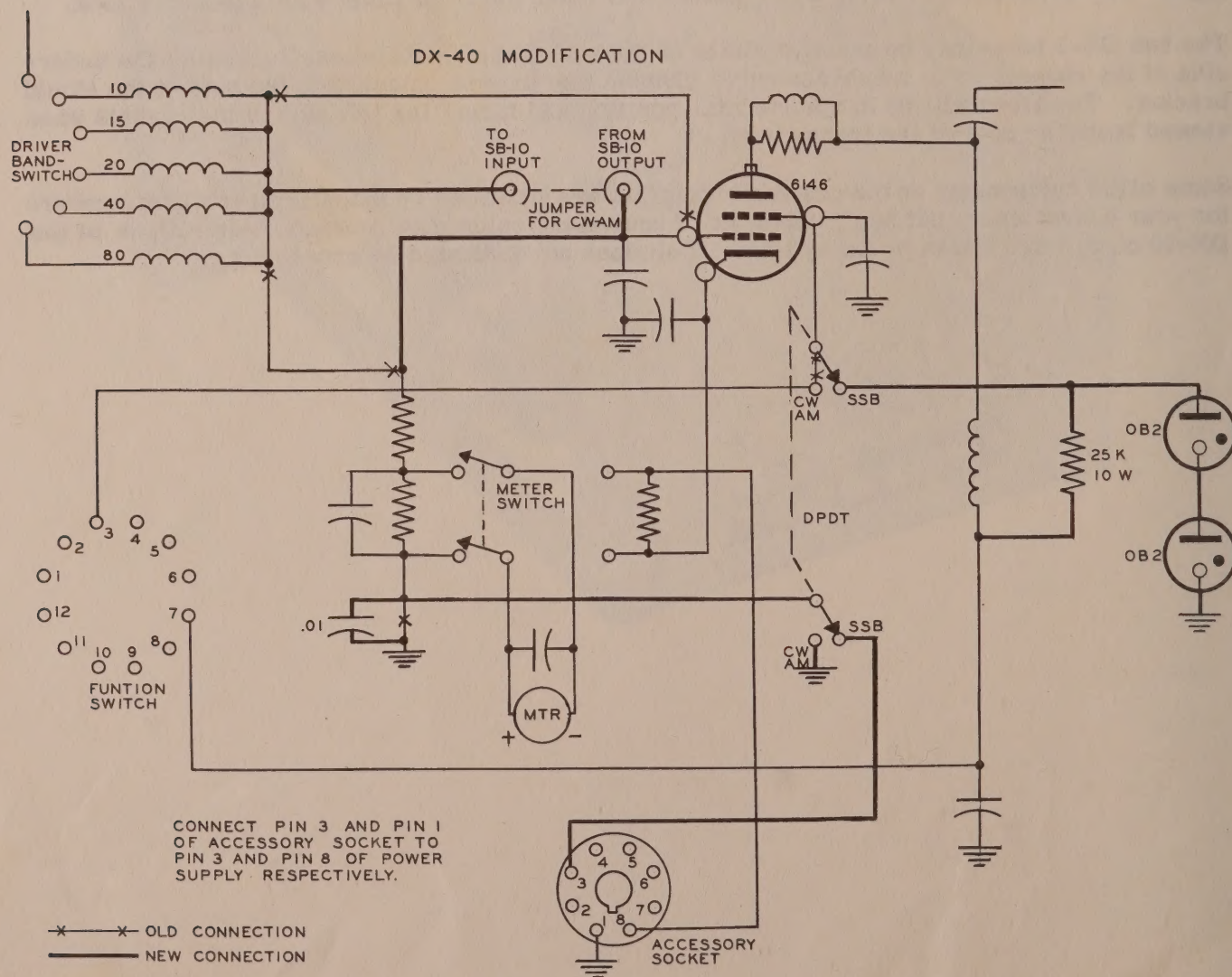
Some of the components on the schematic diagram are identified by manufacturer's part numbers for your convenience, but any component of equivalent value may be used. Alterations of the DX-40 circuit are shown by heavy lines. Deletions are indicated by crosses.

STANCOR
~~PS-8415~~

FEDERAL 1159
SARKES TARZIAN 50



DX-40 MODIFICATION





HEATH

Company

A SUBSIDIARY OF DAYSTROM, INC.

BENTON HARBOR, MICHIGAN . YUKon 3-3961

MANUFACTURERS OF *Heathkit* ELECTRONIC INSTRUMENTS

August 13, 1959

CDR. G. E. Olson
MCAAS Beaufort, South Carolina

Dear Sir:

Thank you for your letter received July 31 requesting additional information on various pieces of our amateur equipment.

We are including with this letter specifications of the Model SB-10 and the manner in which it is operated with Heath equipment.

The only thing that we might add to this information is that it only requires about 3 watts of driving power for full output fed from a low impedance source.

We have forwarded to you free of charge a replacement Construction Manual for the DX-20.

When operating the DX-20 VFO, it is ~~not~~ necessary to short out the radio frequency choke on the oscillator stage and also necessary to power the VFO from a separate source.

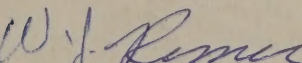
You will also find contained a suggested circuit for plate modulator that will work with the DX-20. We would like to add that we do not recommend plate modulation of the DX-20 and any modification of this type must be done at the owner's responsibility.

Also please keep in mind that the transmitter cannot be loaded as heavily as the CW condition because damage might occur to the power supply.

We wish to express our appreciation to you for writing to us on this matter and wish you to feel free to contact us whenever we might be of further assistance.

Yours truly,

HEATH COMPANY



W. J. Remer

Technical Consultant

K8GND

i/encl.



HEATH

Company

A SUBSIDIARY OF DAYSTROM, INC.

BENTON HARBOR, MICHIGAN • YUkon 3-3961

MANUFACTURERS OF *Heathkit* ELECTRONIC INSTRUMENTS

Dear Customer:

The enclosed specification sheets of the Model SB-10 and also our Model TX-1 will help you to compare and note the connections and type circuits that are involved.

We have not attempted to use the SB-10 with any other transmitters than the DX-100, DX-100B and the TX-1. Therefore, we do not know as to the efficiency of this unit when used with other transmitters.

There is a modification kit available for the DX-100 and DX-100B conversion so that the Side Band Adapter may be used in conjunction with them. It is the MK-1. However, again, we do not know whether this kit is adaptable to other manufacturers' transmitters as we have not attempted operation of this kind.

Generally speaking, the output of the transmitter is modified to Class AB1 operation, and the SB-10 is operated straight-through on fundamental frequencies.

Now that the SB-10 has been released, there undoubtedly will be articles appearing in various Ham publications concerning the use of the unit with transmitters other than those listed above. As a matter of policy, Heath Company refrains from recommending alterations to any other manufacturer's equipment.

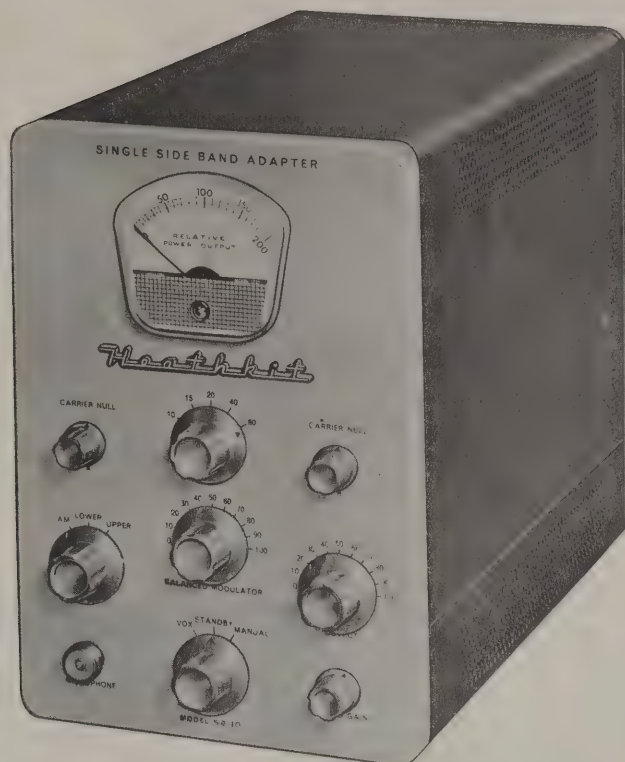
We appreciate your writing to us on this matter, and will be looking forward to hearing from you if we may be of further assistance.

Very truly yours,

HEATH COMPANY

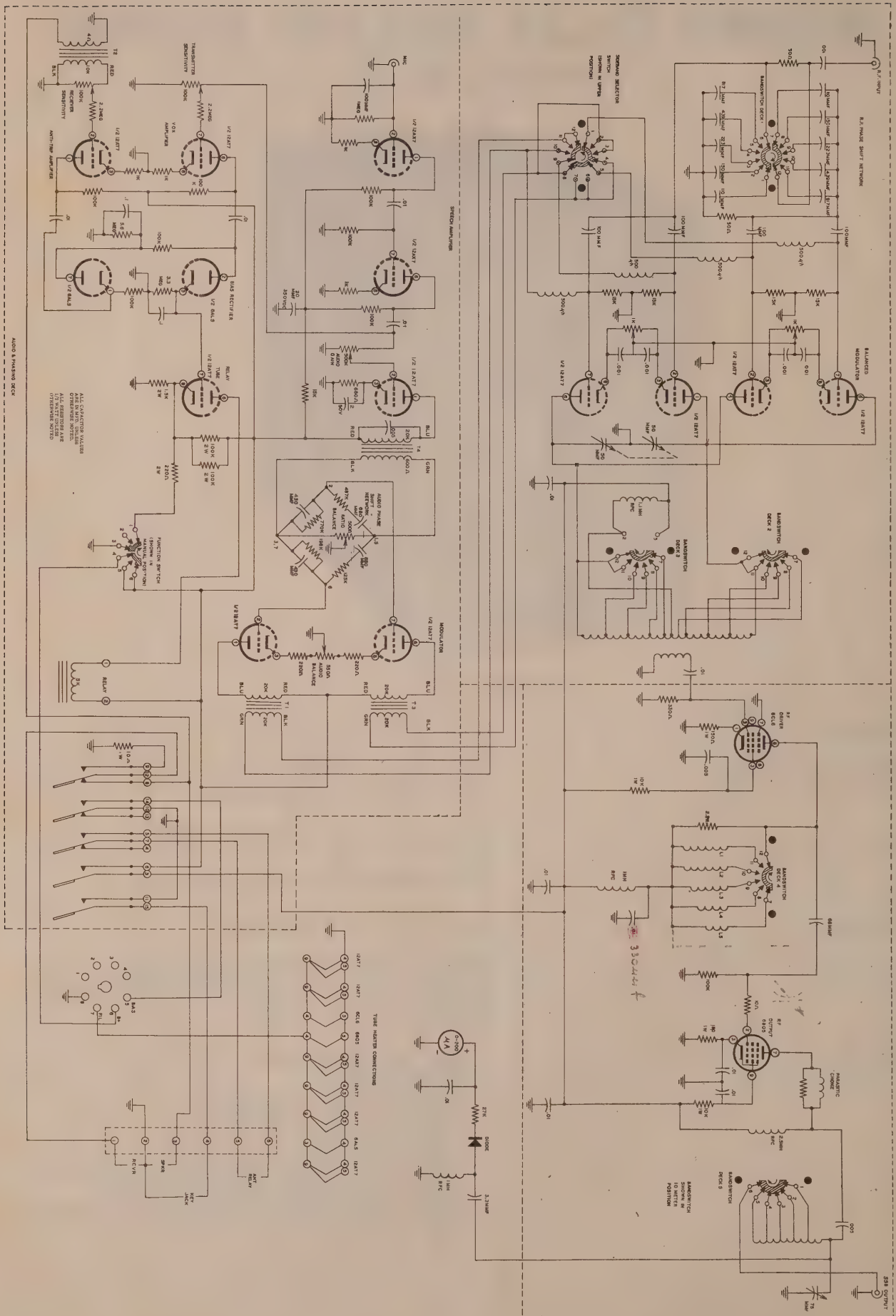
HEATHKIT SINGLE SIDEBAND ADAPTER

MODEL SB-10



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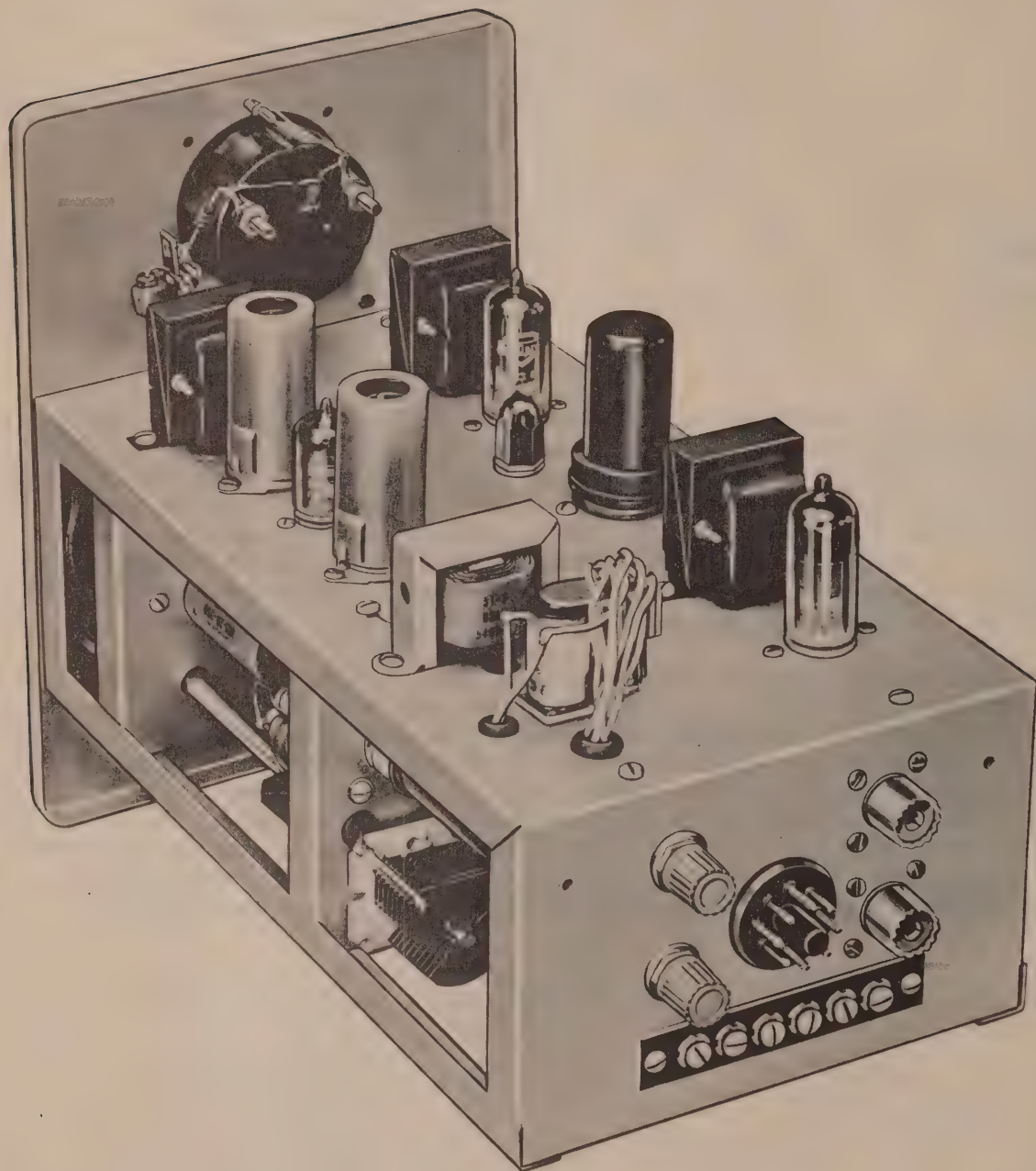


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Carrier Suppression:.....	In excess of 40 db.
Power Requirements:.....	350 VDC, 85 MA (Average) 30 MA (Standby) 140 MA (Transmit) 6.3 VAC, 3.5 AMP
Meter:.....	2 1/2", 200 ua movement, indicates carrier null and relative power output.
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SB-10

SB-10

CARRIER NULL DRIFT

- A. Check to see if there is a 1.5K ohm 2 watt resistor in series with the B plus lead to the balanced modulator stages. If there is none, we recommend this modification be made. This pertains to kits previous to 1/8/60.
- B. Try several combinations of 12AT7 tubes (balanced modulators) until a set is found that is compatible. (There are five included with the kit that may be used for exchange purposes).
- C. In the early model kits, carbon null potentiometers were used. If the above suggestions do not correct the drift condition, the substitution of wire wound 1 K ohm potentiometers may be found to be a worthwhile change.

INABILITY TO NULL THE CARRIER OR APPARENT OSCILLATION

- A. The most common cause of this condition is over-injection of RF excitation to the SB-10 input. (The SB-10 requires approximately 3 watts of RF drive for full sideband output. In most cases, much less than a watt of RF injection is required for sufficient sideband output to efficiently drive a pair of 6146 tubes operated Class AB-1).
- B. Check the 6CL6 and 6BQ5 tubes. (Although these tubes may test good they sometimes will oscillate when used in the SB-10. Try substitutions).
- C. Check the .01 microfarad RF bypass condensers for an open condition.
- D. The balanced modulator plate lead dress can be critical. Try moving the positions of these leads somewhat.
- E. If this condition exists on only one or two bands, (usually the 10, 15 or 20 meter band), try detuning the slug tuned coil (SB-10) until the oscillation disappears.
- F. Neutralization must be removed from final amplifier circuits when the neutralization circuit is such that the RF feedback path is connected ahead of the SB-10 RF input takeoff point. (Such as the TX-1 with the old type mode switch. A new type mode switch 63-196 is available which will switch out neutralization for Single Sideband and restore it for AM and CW operation).

GENERAL SB-10 ADJUSTMENT INFORMATION

1. Reduce the transmitter grid drive controls to a minimum RF output.
2. Unbalance the SB-10 null controls.
3. Advance the transmitter drive controls, (TX-1 and DX-100, first the drive tuning and then the drive potentiometer if necessary). Watch the relative output meter on the SB-10 as the drive is increased, and you will note that there will be a noticeable decrease in the upward ascent of the meter in relation to the amount of increased drive. At this point, decrease the grid drive until the meter movement is at the top end of the rapid portion of it's descent.
4. Null the carrier.

5. Advance the audio gain control clockwise from a full counterclockwise position, (usually about 1/3 of it's rotation). The meter should now kick up to approximately 30% of the above mentioned indication on modulation peaks. (If any grid current is observed in the final amplifier grid circuit, except on extreme voice peaks, it would indicate too much audio injection and the audio gain should be reduced. Remember, any time a class AB-1 final amplifier indicates grid current it is no longer operating in a linear manner.

NOTE: The metering circuit of the SB-10 does indicate relative readings, therefore, no absolute meter reading can be given as the reading will vary from unit to unit and band to band.

The suggested adjustment procedure given above is general and should result in proper or near-proper operation. Again, we would like to point out that there are differences in every station set up that are beyond our control, and one might have to deviate slightly from the suggested procedure to obtain a perfect operating condition.

When using the SB-10 in conjunction with the TX-1 or DX-100, do not become alarmed if the meter, when switched to read Final Plate Current, does not indicate high values of current during modulation. The sluggishness of the meter is due to "damping factor" and its mechanical inability to follow instantaneous peak current.

SB-10

SB-10

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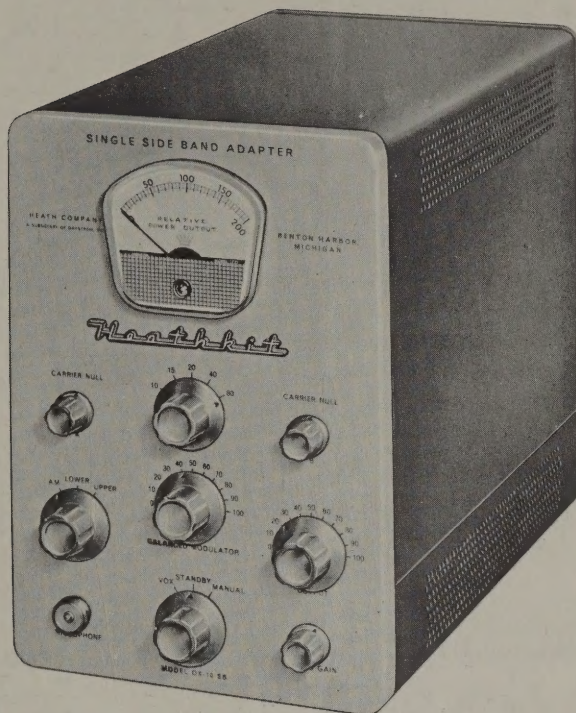
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